Space Weather Forecast

Issued on Wednesday, 03 January 2024 at 13:19 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Further Moderate flares likely with a slight chance of isolated Strong flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with one small Moderate flare observed from the complex region in the northeast. This continues to be the main region of note and although some splitting of the main spot has occurred, a complex magnetic configuration persists with multiple smaller spots of mixed polarity. There are a total of five sunspot regions on the disc, with the other four all smaller and simpler.

A number of coronal mass ejections (CMEs) were visible in imagery, however these have all been assessed as being off the Earth-Sun line with no Earth-directed CMEs occurring.

Solar Wind / Geomagnetic: Solar winds were indicative of a weak fast wind from a coronal hole, followed by a more recent arrival of a CME, likely from the Strong flare that left the sun on 31 Dec. Speeds varied between 380-450km/s for much of the period, but increased abruptly to peak at 466km/s at 03/0456 UTC. Since then speeds have steadily declined to around 420km/s. The Interplanetary Magnetic Field (IMF), initially varied between weak and moderate levels, but increased to peak at more persistently moderate levels, following the CME arrival, but has since become weak again. The north-south component, Bz varied weakly between northward and southward directions at first, but reached moderately positive levels briefly, following the CME arrival, then became predominantly weakly negative. Geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: Count rate of energetic particles (high energy protons) was mostly is at background levels, but on an increasing trend, with observed values close to the S1/Minor Storm threshold at time of issue.

Four-Day Space Weather Forecast Summary

Solar Activity: The complex region in the northeast dominates the flare risk during the forecast period. Generally Moderate activity is expected, with a slight chance of further isolated Strong flares.

Solar Wind / Geomagnetic Activity: The CME from the strong flare on 31 Dec appears to have given Earth a minor glancing impact early on 03 Jan, with minimal geomagnetic effects observed. There is a chance for one or two weak CMEs to arrive at Earth between day 1 and early day 2 (03-04 Jan), but these are low confidence to occur and would likely only result in very minor geomagnetic effects. Current fast winds are expected to continue days 1-2 (03-04 Jan), before easing to background days 3-4 (05-06 Jan). No other enhancements are forecast. Quiet geomagnetic activity is expected for much of the period, with a decreasing chance of isolated Unsettled intervals. Any CME influence on day 1 or 2 (03-04 Jan) will bring a slight chance of Active intervals.

Energetic Particles / Solar Radiation: Count rate of energetic particles (high energy protons) has risen close to the S1/Minor Storm threshold in response to recent significant flare activity.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

Met Office Space Weather Forecast

There is a chance of exceeding S1 storm levels on day 1 and 2 (03-04 Jan), then a slight chance on subsequent days, dependent on any further notable flares occurring.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	55	55	55	55
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	40	20	5	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.